SOLUTION OF MISCEL. PROB. (1) (SEE P. 149), BY PROF. KERSHNER.

$$(1+x)^n = 1 + C_1x + C_2x^2 + \ldots + C_2x^{n-2} + C_1x^{n-1} + x^n,$$
$$(1+x)^n = x^n + C_1x^{n-1} + C_2x^{n-2} + \ldots + C_2x^2 + C_1x + 1;$$
$$\therefore \quad (1+x)^{2n} = x^n + C_1x^{n+1} + C_1x^{n-1} + C_2x^{n+2} + C_1x^n + C_2x^{n-2} + \&c.$$

The coefficient of x^n in $(1+x)^{2n}$ is

$$\frac{1.3.5\ldots(2n-1)}{1.3.5\ldots n} \times 2^n,$$

by the binomial expansion, and in the product above, $1 + C_1^2 + C_2^2 + \&c.$;

$$\therefore\ 1 + n^2 + \left\{\frac{n(n-1)}{1.2}\right\}^2 + \&c. = \frac{1.3.5\ldots(2n-1)}{1.3.5\ldots n} \times 2^n.$$

QUERY BY PROF. WM. WOOLSEY JOHNSON, ANNAPOLIS, MD.—"It is stated in Brande and Cox' Dictionary of Sc. and Lit., with respect to Fermat's 'last theorem', viz.: that $x^n + y^n = z^n$ is insoluble in integers except when $n = 2$, that no complete demonstration has yet been given. Yet Barlow in his Theory of Numbers gives what professes to be a demonstration of the impossibility of the equivalent equation $x^n - y^n = z^n$, p. 164.

What is the fallacy in Barlow's demonstration and by whom was it first exposed?"

ANSWER BY PROF. JOHN E. DAVIES, MADISON, WISCONSIN.

By reference to the famous "Report on the Theory of Numbers" by Prof. H. J. Stephen Smith of Oxford, in the British Association for the Advancement of Science Reports, 1859–62; in the Report for 1860 will be found a *resume* of Kummer's work on Fermat's Theorems. Kummer has shown its impossibility for all values of the exponent up to 100 and seems to have considered his proof general as the title of his paper is "Allgemeiner Beweis des Fermat'schen Satzes dass die Gleichung $x^\lambda + y^\lambda = z^\lambda$ unlösbar ist für all diejenigen Potenz-Exponenten λ welche ungeraden Primzahlen sind, und in der zæhlern der ersten $\frac{1}{2}(\lambda-3)$ Bernouille'schen Zahlen als Factoren nicht vorkommen." The excepted primes, numbers like 37, 59, 67, &c., which divide the numerators of some one of the 1st $\frac{1}{2}(\lambda - 3)$ fractions of Bernouilli were afterward treated by Kummer, and all those satisfying certain conditions were also found to be included in the theorem.

Concerning Barlow's proof, Prof. Smith says—"The proof in Barlow's Theory of Numbers, pp 160–169, is erroneous, as it reposes (see p. 168) on an elementary proposition (Cor. 2, p. 20) which is untrue." I think it very likely that the error *had* been noticed before, but I do not know where.